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SCIENCE NEWS LETTER

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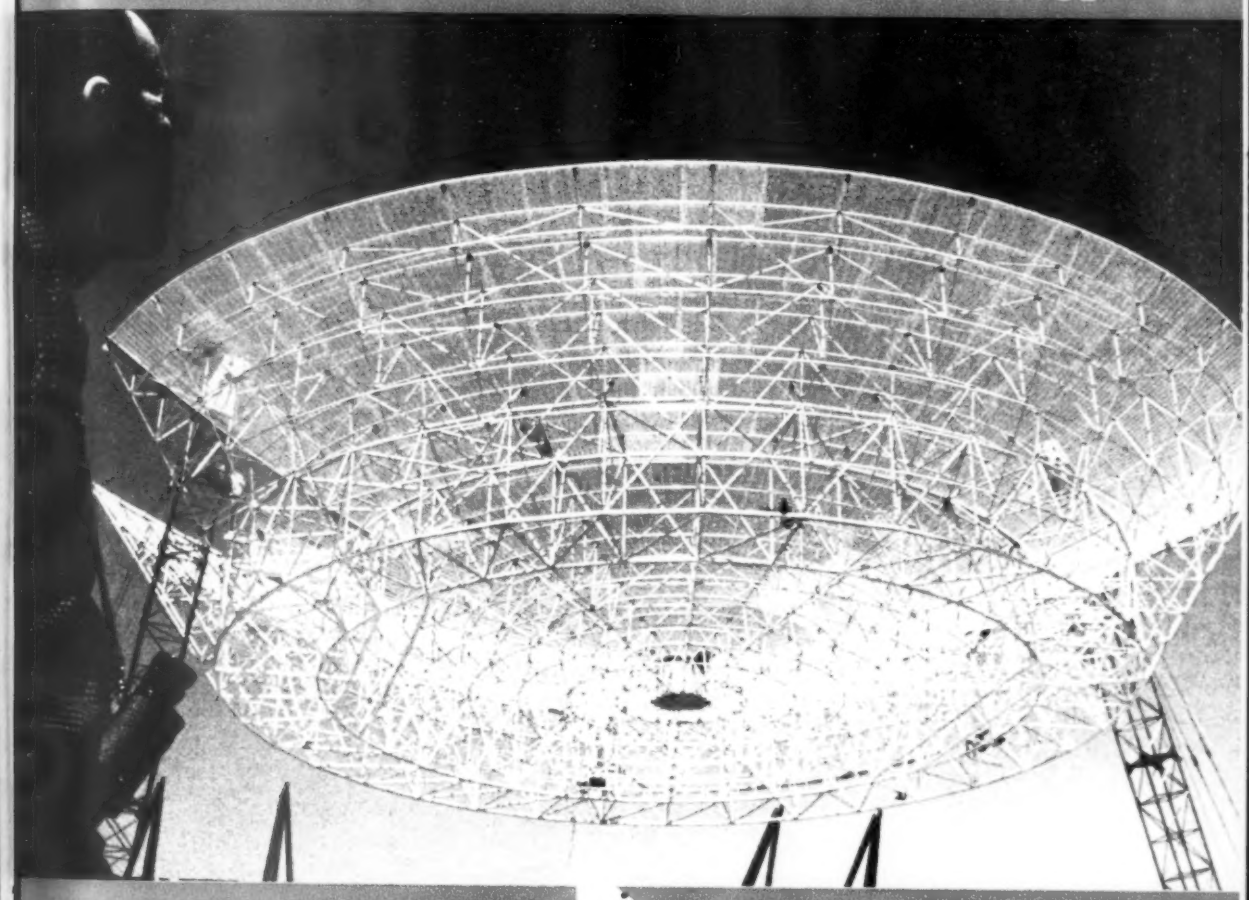
THE WEEKLY SUMMARY OF CURRENT SCIENCE



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See Page 268

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You read of island paradises aplenty in the United States and Canada, of art colonies (artists search for picturesque locations where costs are low!), of areas with almost a perfect climate or with flowers on every side. Here are the real U.S.A.-brand Shangri-Las made for the man or woman who's had enough of crowds. Here, too, are unspoiled seashore villages, tropics-like islands, and dozens of other spots just about perfect for your retirement or vacation **at some of the lowest prices you've heard of since the gone-forever prewar days. They're all in the United States and Canada, and for good measure you also read about the low-cost paradises in Hawaii, the Virgin Islands and Puerto Rico.**

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SPACE

Find Life on Mars 1964?

By 1964 a U.S. space probe to Mars could reveal if simple life forms exist on the planet as has been indicated from astronomical observations, Tove Neville reports.

➤ BY 1964 the United States may find out if life exists on the planet Mars. This will be done by sending a space probe with a telescope to Mars to photograph the planet with visible and infrared light.

Such studies can reveal if organic molecules (the building blocks of living forms) are present on the planet's surface, Dr. William H. Pickering, director of Jet Propulsion Laboratory, California Institute of Technology, Pasadena, told SCIENCE SERVICE.

Infrared spectroscopy done with the 200-inch Mt. Palomar telescope indicates that organic molecules may exist on Mars, but the evidence is not clear-cut, Dr. Pickering said. The Mars probe would have to circle as close as 20,000 to 30,000 miles from the planet to get this evidence, he said. When closest Mars is about 48,000,000 miles from the earth on the average.

Dr. Pickering told the American Rocket Society meeting in New York that scientists hope to find out more about the magnetic fields and the radiation particles surrounding Venus and Mars. They would like to determine with space probes if radiation belts similar to the Van Allen belts surrounding the earth are also present in the vicinity of Venus and Mars. These radiation belts of trapped particles are considered dangerous to space travelers.

The Mars probe would be part of the Mariner program that includes eventual landing of instruments on Venus and Mars to find out more about conditions on the planets' surfaces.

Dr. Pickering said that the lunar probes, Ranger and Surveyor, will complete increasingly complicated missions, landing instruments to make physical and chemical analysis of the moon. The probes will be sterilized with heat and ethylene oxide before take-off to insure that no earth bacteria contaminate the surface and destroy evidence of the moon's origin.

• Science News Letter, 80:267 October 21, 1961

Salvage Space Hardware

➤ AS MUCH AS 20% of the cost on every 1,000,000 pounds of "space hardware" sent up in a year could be saved if the booster vehicle were reused. This important saving to American taxpayers could be as much as 27% in 10,000,000 pounds of annual space transport, two scientists reported at the American Rocket Society meeting in New York.

Drs. William S. Porter and R. G. Voss of the National Aeronautics and Space Administration's Marshall Space Flight Center, Huntsville, Ala., said this saving is possible if the recovery operation of the space vehicle and the refurbishment rate for reuse do not amount to more than 55% of the cost of a new booster.

They based their calculations on transporting large volumes of pay loads into low altitude orbits with a Saturn-type two-stage rocket. The large first stage of the rocket would be recovered and used again instead of being totally lost as is now the case.

Two methods are being considered for the recovery, glider plane and parachute. Rogallo, a paraglider wing, is at present considered impractical because it has a limited range and would not be able to return to the launching site without additional power or a tow aircraft.

The parachute recovery has a disadvantage in that the booster would be dropped in the sea where salt walter corrosion could damage the material.

However, tests made on an H-1 rocket engine after immersion in salt water showed that the refurbishment only amounted to about four percent of the cost of a new engine.

These preliminary results make parachute recovery look more favorable than previously thought, the scientists said, and recovery of the boosters should be begun as soon as possible because of the great savings.

• Science News Letter, 80:267 October 21, 1961

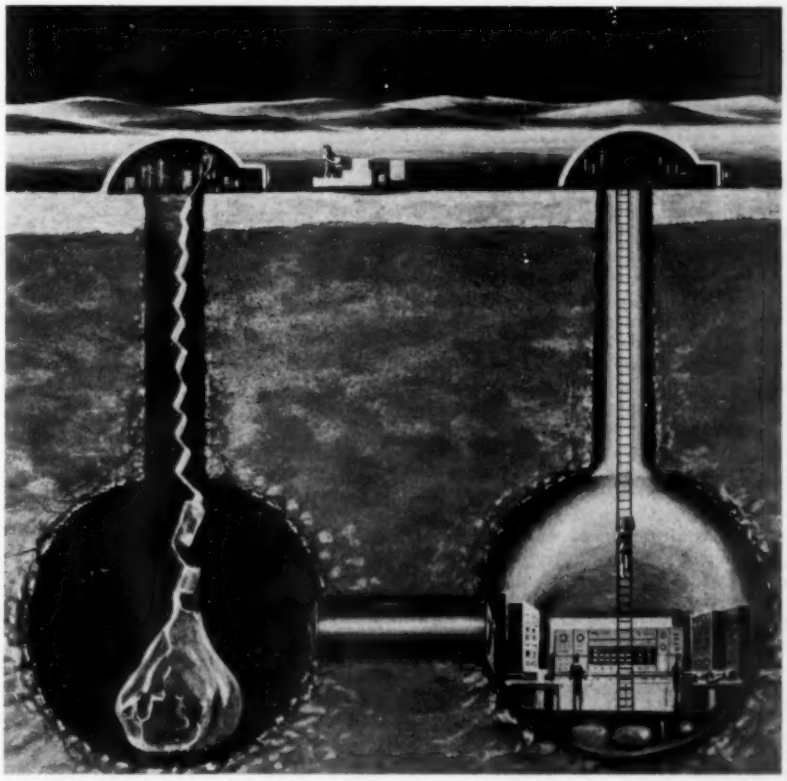
Moon Station by 1970

➤ THE U.S. has the know-how and resources to build a permanent manned station on the moon by 1970, the American Rocket Society was told in New York.

Dr. H. H. Koelle of the Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala., said such a moon station could be expanded into a moon settlement by 1975. He predicted manned planetary flights will begin between 1972 and 1974.

The techniques of space transportation are expected to progress rapidly during the next two decades, resulting in lower cost for a "round trip to an earth orbit or to the moon," he said.

Calculations show that by 1975, about 5,000 manned round trips from the earth surface to a low altitude orbit could take place yearly. As space travel becomes more economical, commercial space flight is ex-



MOON BASE—A series of connected pressurized chambers were suggested as an underground moon base by General Electric engineer Germano Di Leonardo at the American Rocket Society meeting in New York. An airtight membrane is being inflated in the left chamber; life support equipment is shown installed in the right. Structures on the surface contain airlocks.

ASTRONAUT SEAT FOR SPACE LANDINGS—Built to withstand 60 g's.

pected to follow—sometime between 1975 and 1980. The younger generation of today will take an active part in such flights, Dr. Koelle predicted.

He said the following developments could contribute to cheaper space transportation:

1. Increased size of launch vehicles.
2. Increased reliability of launch vehicles.
3. Multiple use of each launch vehicle.
4. Increased performance of propulsion systems.
5. Eventual use of extraterrestrial resources.
6. Increase of available economic resources.
7. Increase of space activities in general.

• Science News Letter, 80:267 October 21, 1961

Life Support Systems

➤ NO MAJOR TECHNOLOGICAL DEVELOPMENTS will be necessary to meet the life support requirements for the next generation of manned spacecraft, a physician and an engineer reported to the American Rocket Society in New York.

Dr. James N. Waggoner, health director of the Garrett Corporation, Los Angeles, and project engineer William L. Burriss, also of the Garrett Corporation, said they have concluded that certain changes should be made in environmental control systems in order to meet man's physiological requirements for extended trips in space.

The scientists reported a mixed gas atmosphere rather than 100% oxygen would be preferable. They suggested a mixture of oxygen and nitrogen be used. The "atmospheric" fluids could be stored on the space ships at extremely low temperatures (at about minus 400 degrees Fahrenheit) in smaller and therefore lighter containers because these fluids contract when cooled.

The scientists also recommended that a space radiator with an ethylene-glycol-water mixture be used for removing heat from the astronaut's cabin. This would reduce the amount of evaporation on the skin and cut down the astronaut's water requirements.

These changes would make the longer space trip possible, using chemical power systems such as hydrogen-oxygen fuel cells or hydrogen-oxygen dynamic heat engines.

• Science News Letter, 80:268 October 21, 1961

Seat for Space Landings

➤ A SEAT designed to protect an astronaut from pressures up to 60 times his own weight, during space landings, was described at the American Rocket Society meeting in New York.

The safety device was reported by W. C. Boyce and H. E. Freeman of the Chance Vought Corporation, Dallas, Tex. Developed for the Air Force, it will be tested first with dummies and later with men.

The seat includes a fiberglass "jacket" to protect the body and an "apron" for the legs. The device could also be used in military aircraft for crash landings or in automobile and aircraft accidents in which the high gravitational forces of 60 g's occur.

• Science News Letter, 80:268 October 21, 1961

SPACE

Zero-Gravity Cell Makes Oxygen for Use in Space

➤ A ZERO-GRAVITY electrolytic cell, capable of producing oxygen under the weightless conditions of space flight, has been developed by scientists at Battelle Memorial Institute, Columbus, Ohio.

Standard cells depend on the pull of gravity on the electrolytic solution to separate water into hydrogen and oxygen. The new experimental cell, however, defies natural gravity. The centrifugal force produced by rotation acts as an artificial gravity field.

In space, the cell could be used with another Battelle-made device that chemically changes carbon dioxide in an astronaut's breath into carbon and water. This device can use the hydrogen produced by the cell, while the cell uses the water to produce more breathing oxygen. Together, the two could create a livable atmosphere in a spacecraft for a two-year flight, with no supplemental oxygen supply needed.

• Science News Letter, 80:268 October 21, 1961

RADIO ASTRONOMY

Biggest U.S. Radio "Dish" Installed in California

See Front Cover

➤ AMERICA'S BIGGEST radio telescope "dish," 150 feet across, has been installed on Stanford University campus, Stanford, Calif.

The steel and aluminum parabolic antenna, seen on the cover of this week's SCIENCE NEWS LETTER, will be used for radar and radio explorations of the solar system before the end of the year.

The $350,000 dish was designed and built by Stanford Research Institute with support of the Air Force Office of Aerospace Research and the Defense Atomic Support Agency. It is the first of three such radio telescopes planned for the U. S.

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PUBLIC HEALTH

Disaster Medical Care

➤ MEDICAL SELF-HELP training useful in any disaster situation will soon be offered to the American people. Whether or not present nuclear war dangers continue, free instruction will be provided by medical and health specialists for possible use in shelters all over the country.

Aimed at teaching families how to survive a national emergency, a student handbook of 12 lessons has been prepared along with an instructor's guide to be used by persons trained under doctors' supervision.

Dr. Carruth J. Wagner, chief, division of health mobilization, U.S. Public Health Service, and Dr. Frank W. Barton, secretary of the American Medical Association Committee on Disaster Medical Care of the Council on National Security, supervised the compilation of the training material. They will help initiate three nationwide workshops this fall and winter to introduce the lessons.

The first workshop was at Sheepshead Bay, Brooklyn, N.Y., Oct. 16-19. The other two will be at Alameda, Calif., Nov. 19-22, and at Battle Creek, Mich., Dec. 4-7.

Approximately 100 professional health leaders will be oriented at these workshops. They will obtain training kits and return to their states to develop state programs.

Simple health lessons such as how to get rid of cockroaches and bedbugs will be taught along with the less familiar techniques of caring for people and handling objects covered with radioactive dust.

How to deliver a baby; to immunize against such diseases as smallpox, diphtheria, tetanus, whooping cough and poliomyelitis; to care for various types of burns, are among the lessons.

The always useful techniques of artificial respiration, both mouth-to-mouth and the back-pressure arm-lift method, will be taught, along with methods of stopping bleeding, how to bandage wounds and take care of persons in shock.

Fractures and splinting, how to transport the injured and other techniques one needs to know when isolated from doctors are among the lesson topics.

Dr. David M. Benford of White Plains, N.Y., represented the American Medical Association as leader of the workshop held in Brooklyn. Invited to participate were representatives of the American Hospital Association, the American Dental Association, the American Pharmaceutical Association, along with public health officials and nursing personnel, all of whom are cooperating in getting the medical self-help training under way.

No date has been set for the country-wide schedule of courses but the P.H.S. division of health mobilization said classes should begin this winter.

Each state is expected to establish a medical self-help committee to supervise the program and use of the training material.

• Science News Letter, 80:269 October 21, 1961

PUBLIC HEALTH

Gains in Latin America

➤ A DROP in the number of reported cases of six major diseases in Latin American countries was reported at the annual meeting of the Pan American Health Organization's directing council in Washington, D. C.

Dr. Abraham Horwitz, council secretary and director of the Pan American Sanitary Bureau, listed leprosy, yellow fever, tuberculosis, polio, malaria and yaws as occurring less frequently.

He also said that distribution of Incaparina, a low-cost health food developed by the Institute of Nutrition of Central America and Panama (INCAP), has helped enrich the diet of poor families in Central America.

Incaparina is made from corn meal, sorghum, cottonseed flour and yeast. As a substitute for milk in the diet, it is particularly effective against malnutrition in children. The daily cost per child is about four cents.

A locally grown base food other than corn can be substituted in areas where corn is not available.

The council is comprised of health authorities from the United States and 20 other American republics, along with France, the Netherlands and the United Kingdom on behalf of their territories in the Americas.

The organization will have a $13,178,869 budget in 1962, a 7.9% increase over the 1961 figure. The money will be used to assist American republics with 303 health projects—49 more than the number carried out in 1961.

Funds come from quota assessments to member states, United Nations technical assistance allocations, the World Health Organization, and other sources.

Next year's plans include more work on malaria eradication, nutrition, and improving community water supplies.

Better statistical services to make planning less difficult and better health legislation are major needs in Latin America, Dr. Horwitz said. He pointed out that a 2.6% increase in population has not been accompanied by a proportional increase in economic resources and personnel to meet health needs.

He said the member states have made a significant contribution by recognizing that public health is a basic component of economic and social development.

• Science News Letter, 80:269 October 21, 1961

ZERO GRAVITY CELL—An electrolytic cell produces oxygen for space travel independent of natural gravity. The bottles demonstrate production of hydrogen and oxygen within the cell. (See story opposite page.)

VITAL STATISTICS

Overcrowded U.S. Seen

➤ IF THE CURRENT high birth rate in the United States continued indefinitely, the year 2611 would find this country with one person for every square foot of land. The population would exceed one billion in less than a century, hit the one-person-per-square-foot level in 650 years, and be so heavy with people in 1,700 years that the U. S. population would outweigh the earth.

Dr. Ansley J. Coale, director of Princeton University's population research office, used these figures to stress what he calls the literal impossibility of maintaining the U. S. present rate of fertility and population increase.

Effects of the World War II "baby boom" have reached their peak, "or will in the near future," he said. But from 1980 on, if the present birth rate continues, both the child and adult population would increase at a yearly rate of two percent, doubling every 35 years.

Dr. Coale told the symposium on the Commonwealth of Children, meeting at Duke University, Durham, N. C., that an acceptable social program for restricting births is difficult to formulate.

The symposium was held in honor of Dr. Wilburt C. Davison, a renowned pediatrician at Duke University.

He said American couples, now favoring two, three and four children, cannot reasonably be expected to limit the size of their families until overcrowding becomes so acute they feel unable to support another child adequately. By then, the overall population situation already would be "a catastrophe."

Meanwhile, he sees strong arguments against a return to the lower pre-1940 birth rates. It would mean higher rates of spinsterhood and more childless marriages.

Moreover, a family with four children is often beneficial to the children themselves, he said. An only child has psychological burdens. Two children cause maximum sibling rivalry. Three children mean that "two are likely to gang up on one."

He suggested concentrating on immediate problems—the need for more school space, more teachers and more jobs—rather than worrying about long-range overpopulation. Today's problems, he said, are neither easy nor overwhelming.

• Science News Letter, 80:270 October 21, 1961

MEDICINE

Special Hospitals Needed

➤ THE DAY of sirens screaming down the street while an ambulance speeds an accident victim to the nearest emergency room in a general hospital will some day come to an end, Dr. Preston A. Wade of Cornell University Medical College, New York, has predicted.

Dr. Wade, a professor of clinical surgery who was called into consultation by the President's physician during his recent back trouble, told the Clinical Congress of the American College of Surgeons in Chicago that there should be specialized accident hospitals in this country.

Dr. Wade reported in detail a Cornell study of car design undertaken in the hope of preventing accidents. He said accident victims sometimes do not get good care in hospital emergency rooms.

Training young men in general surgery before they take up a specialty will be necessary if orthopedic surgeons respond to the challenge to become trauma or injury surgeons.

The surgeon may not have time to learn the intricacies of lung cancer, Dr. Wade said, but he certainly could learn how to handle a caved-in chest injury.

Until the day comes when trauma hospitals will be more widespread in this country (there are a few here and in England, and they have been operating for years in Austria and Hungary), Dr. Wade advised the American College of Surgeons to advance the teaching of trauma care to medical students, resident physicians and every surgeon regardless of his specialty.

• Science News Letter, 80:270 October 21, 1961

Human Organs Removal

➤ HUMAN ORGANS can soon be removed from the body for repair and safely returned, three University of Minnesota researchers predicted at the 47th annual Clinical Congress of the American College of Surgeons in Chicago.

Ten dogs whose stomachs were removed and later put back have survived from three months to two years in spite of cutting nervous system connections.

Drs. Richard C. Lillehei, Jerrold K. Longerbeam and Bernard Goott of Rochester, Minn., reported similarly removing and putting back the small bowel. Both bowel and stomach can go as long as five hours without a blood supply if they are cooled to about 41 degrees Fahrenheit.

The stomach's hydrochloric acid secretion gradually returned but the digestive enzyme, pepsin, had not been found in any significant amount after two years. Normal digestion and nutrition were maintained, however.

Two Texas surgeons, Drs. H. Edward Garrett and Sam W. Law of Baylor University College of Medicine, Houston, reported a new adhesive material that congeals wounds rapidly.

Called "Ad/here," the adhesive is manufactured by the Borden Company. The chemical, methyl alpha-cyanocrylate, controlled bleeding in ten experimental dogs when placed on the suture line before releasing the blood vessel clamps.

• Science News Letter, 80:270 October 21, 1961

MEDICINE

Test Rapidly Pinpoints TB Germ's Relative

➤ A SIMPLE TEST has been developed for speedily identifying one of several bacteria that closely resemble those causing tuberculosis, but produce diseases that do not respond to standard TB drug treatments.

Mycobacterium fortuitum, one of the "atypical" bacteria related to the tubercle bacillus, can now be recognized from a single test tube culture in three days. Testing formerly involved several stages, three to four weeks' time, and equipment most laboratories do not have.

The new technique was devised by Dr. Lawrence G. Wayne, microbiological research chief at the San Fernando, Calif., Veterans Administration hospital.

The germ, found in soil and even in the mouths of healthy persons, may reach the lung and cause a disease resembling tuberculosis, Dr. Wayne said. He believes the test will help prevent errors in diagnosis and treatment.

Dr. Wayne estimates that one to five percent of all patients in TB hospitals may be infected with one of the four known "atypical" bacteria, rather than with the tubercle bacillus.

• Science News Letter, 80:270 October 21, 1961

BIOLOGY

"Alarm Clock" Brings Snakes to Surface

➤ A BUILT-IN "ALARM CLOCK" apparently helps a brightly-banded little desert snake come to the surface at night after he has buried himself to escape the day's heat.

Drs. Kenneth Norris and J. Lee Kavanau, University of California, Los Angeles, zoologists, are studying the habits of the reptile known as the shovel-nosed ground snake.

It had been noted that these snakes, which remain buried in the sand most of the time, appear to come to surface virtually in unison over a wide area every night. It was thought that they followed a rising heat barrier in the sand which rises as the sand cools off each night.

Laboratory studies, with special electronic oscillators to follow the reptile's movements in detail in a laboratory "sandpile," have indicated that there may be a little more to it than this. The investigation has suggested that the snake has a biological alarm clock which "wakes" him up about 23 hours after his last emergence at the surface.

While the onset of evening darkness occurs at almost precise 24-hour intervals, the snake becomes active when his alarm "goes off" an hour earlier perhaps, which may allow him to take advantage of cool days when the sand cools off earlier than usual. The rising heat barrier may enter into the picture, however.

• Science News Letter, 80:270 October 21, 1961

TECHNOLOGY

Computer Analyzes Palms

➤ CHARACTERISTICS observed in human palm prints and analyzed with the aid of an electronic computer may lead to a new method for detecting the presence of certain inheritable conditions, a Tulane University scientist reported in Endicott, N.Y.

Dr. H. Warner Kloepfer of the University's School of Medicine, New Orleans, La., said that certain features were recorded with much greater frequency in the palm prints of persons with these conditions than in the palm prints of persons picked at random.

He spoke at a symposium on the use of computers in medical and biological research, sponsored by the International Business Machines Corporation. His report was prepared jointly with an associate, Dr. Harold Cummins.

Dr. Kloepfer stressed that the study of palm prints is closely related to the study of fingerprints. Only the very fine, almost indistinguishable lines on the skin surface are recorded.

Prominent palm creases such as those employed in palm-reading are not analyzed, he stressed.

The work of Drs. Kloepfer and Cummins is based on some 2,000 palm prints made in Germany just before World War II. When research in Germany halted at the start of the war, an associate of Dr. Cummins brought the prints to America.

When the scientists classified the prints, they found between seven and 65 variables in a feature area. There are ten such feature areas in a single palm. With the aid of an electronic computer, the scientists further studied the vast number of interrelationships between the variables in different feature areas.

By comparing the frequency with which characteristics in the left hand appeared in the right hand, they determined the extent to which certain of the characteristics are inheritable.

The scientific technique for this work is called the "twin method technique." It involves a procedure by which identical twins, derived from a single set of genes, are compared to decide to what extent traits are inheritable.

The analogy was carried over to the palm prints.

Dr. Kloepfer said the studies encompassed these conditions or diseases: two rare eye diseases that can lead to blindness, certain congenital heart diseases and a common type of mental retardation.

• Science News Letter, 80:271 October 21, 1961

TECHNOLOGY

Electronic Computers Are Not "Think" Machines

➤ PERSONS WHO REFER to electronic data computers as "think" machines show lack of thought, Dr. Harold Wooster, chief of the information sciences division, Air Force Office of Scientific Research, said in San Francisco.

The present-day computer is no more a "think" machine than a pencil and a piece of paper, a book, or a set of log tables, he told the Air Force's 8th Symposium on Science and Engineering.

These are totally dependent on a man to put them to a specific, predetermined use. While computers can do very fast arithmetic, store data and even process it, they perform these functions only after being instructed by man in great detail on just what to do, Dr. Wooster said.

Machines are rational and operate on a basis of formal deductive logic in which A inevitably implies B, and B implies C. They lack reason and cannot do what man endowed with reason can do, namely, screen sense from non-sense and make decisions from inadequate or even incorrect data.

It is, therefore, "unthinkable" that they can ever outstrip and enslave man by their intellectual power, as some admirers of the electronic mechanisms have predicted, the information specialist said.

But if computers are not enslaving mankind, they are overwhelming us with more information "than we know what to do with," Dr. Wooster said. "We must find out how this information is to be handled so that the needed information is available, is sufficient in detail and content without being excessive."

Dr. Wooster does not believe the solution necessarily lies in building computers modeled after the human brain and nerve system. "After all, we do not build better and faster airplanes by putting feathers on the wings," he said.

The solution may lie in devising ways to use machines independent of any particular physical system. However, the study of biological information-handling processes is not to be ruled out in developing an information system that will operate with utmost efficiency.

The Air Force is currently engaged in long-range research aimed at an information system that will eliminate unessential data.

• Science News Letter, 80:271 October 21, 1961

MINIATURE COMPUTER DOES WORK OF ROOM-SIZED MODEL

TECHNOLOGY

Miniature Computer Is Size of Bread Loaf

➤ THE FIRST fully miniaturized electronic computer to be shown actually operating has been demonstrated. It is the size of a loaf of bread.

The baby computer, developed at the Burroughs Corporation's Laboratories, Paoli, Pa., can solve single-purpose problems at speeds of a room size computer.

Company spokesmen said a working model was built to show that existing electronic components can be used in shrinking a commercial computer from room size to the size of a desk, and that military electronic equipment can be compressed to a convenient size for aircraft, spacecraft and missiles.

The computer has 5,500 components in a space measuring 3 by 6 by 11 inches, weighs 12 pounds, and can perform 33,000 mathematical calculations per second.

• Science News Letter, 80:271 October 21, 1961

GENERAL SCIENCE

Urge Publication Method To Break Science Log Jam

➤ USE OF a method of getting scientific reports into use without the expense of costly printing is being urged by a committee of the American Documentation Institute, headed by Malcolm Rigby of the American Meteorological Society.

The technique consists of depositing typewritten reports, tables and photographs, with the Library of Congress, which will issue them upon demand in a photographic form. The availability of the research reports is made known by publication of a notice in a scientific journal.

This method of Auxiliary Publication, under the auspices of the American Documentation Institute, was started by Dr. Watson Davis of SCIENCE SERVICE in 1937 as an attempt to solve one of the most vexing problems then facing scientific societies and institutions.

The present number of documents on deposit under this plan is nearly 6,000 and the additions are at the rate of 500 a year.

Auxiliary Publication plans should be more widely used, Mr. Rigby feels, because of the explosive growth in manuscript material awaiting publication as compared to the less sensational growth in publication outlets. This is the result of an increase in the backlog of unpublished material necessitating either the reduction or condensation of lengthy papers.

It is believed because of this scientific publication log jam, many important research results are lost to industry, defense, and other fields of possible utilization.

• Science News Letter, 80:272 October 21, 1961

SPACE

Ecosphere May Shape Life on Distant Planets

➤ THE EXISTENCE of advanced forms of life in outer space is judged not only possible, but extremely probable, by a Polish astronomer whose theories are drawing international attention.

"Highly developed civilizations on the planets of our galaxy should be the rule, rather than the exception," according to Dr. Jan Gadomski.

Dr. Gadomski believes that 90% of the stars in our galaxy have planetary systems. In order for organic life to grow from simple cells to intelligent beings, a planet must have spent 3.5 billion years in what the Polish expert calls the "ecosphere" of a star—a temperate zone of habitability that can be found at a given distance from most stars.

As many as 90% of the stars in the galaxy may have planets that have met this basic condition and, therefore, could have fostered advanced life forms such as man, he states.

Investigations have already shown that 25% of the stars nearest the sun have very massive "planetary satellites," he points out.

For our own solar system, Dr. Gadomski calculates the life-permitting ecosphere between 107,000,000 and 221,000,000 miles from the sun. This would include the earth, Venus and Mars, but takes in only one tenthousandth of the entire system. The temperature would range from minus 94 degrees to 226 degrees Fahrenheit.

The planetary zone does not always coincide with the ecosphere, so all planets cannot be assumed to be capable of supporting life. For large or superhot stars, the ecosphere is larger than for dwarf-sized stars or near-dwarfs such as the sun. Subdwarf stars may have planets far beyond the limits of the ecosphere, and too cold to be habitable.

Dr. Gadomski's theory, originally published in Moscow, is included in the Soviet-Bloc Research in Geophysics, Astronomy and Space, translated by the Office of Technical Services of the U.S. Department of Commerce.

• Science News Letter, 80:272 October 21, 1961

MEDICINE

Pancreas Cancer to Kill 14,000 This Year

➤ AN ESTIMATED 14,000 persons will die this year from cancer of the pancreas, the same incurable disease from which Speaker of the House Sam Rayburn is suffering.

Cancer specialists say there is no known cause—not even a suspicion of what causes it. X-rays do not show the soft tissue shadow of the pancreas, a large gland lying across the back wall of the abdominal cavity.

In itself, cancer of the pancreas can cause death because it interferes with the production by the gland of a digestive juice that helps break down proteins, fats and carbohydrates, which it empties through a duct into the small intestines. Only about one percent of all patients operated on for this type of cancer survive.

Even a small cancer of this gland can spread to the point in which surgery is impossible. It can spread to almost any organ, but the liver and lungs are most frequently affected.

When it has spread as far as the groin, the condition is hopeless and inoperable.

Dr. William McDermott of Harvard Medical School and Massachusetts General Hospital, Boston, several years ago did research under an American Cancer Society grant that led to a successful operation on a spreading cancer of the pancreas in a human.

But Speaker Rayburn's cancer has spread beyond the body parts removed by Dr. McDermott.

The greatest number of patients suffering from cancer of the pancreas are men in their fifties and sixties. Back pain, such as the Speaker reported as possible lumbago, is one of the first symptoms along with fatigue from insomnia. Jaundice and loss of weight usually follow.

In the meantime research goes on which some day may be applicable to this hidden type of cancer that has such a high death rate.

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IN SCIEN

MEDICINE

Lung Clot Diagnosis Can Lower Death Rate

➤ A QUICK new method of diagnosing blood clots in the lung can help lower the present high death rate attributed to the disorder.

By measuring the rise and fall of certain enzymes and pigments in the body, a team of Harvard Medical School and Peter Bent Brigham Hospital scientists found that lung blood clots could be differentiated from other ills with similar symptoms.

Previously, doctors had much difficulty determining whether a patient had suffered a heart attack, pneumonia, or pulmonary embolism (lung blood clots). All three have similar symptoms of heart failure, chest pain, irregular heart beat and fever.

The new method is described in the Journal of the American Medical Association 178:108, 1961, by Drs. Warren E. C. Wacker, Philip J. Snodgrass, Miriam Rosenthal and Elias Amador of Harvard Medical School and Peter Bent Brigham Hospital, Boston.

A word of caution is sounded in diagnosing the presence of lung clots in patients with severe liver disease, however, as liver ailments cause abnormal activity of all three blood substances.

• Science News Letter, 80:272 October 21, 1961

NUTRITION

Liquid Diet Eliminates Football Squad Tension

➤ FOOTBALL PLAYERS who get "butterflies" in their stomachs before the big Saturday football game can banish them by eating a pre-game calorie-rich liquid diet. The diet also improves their physical capabilities, but no results have been announced on the number of games won.

The traditional steak dinner was eaten after the games and football practice at the University of Nebraska, Lincoln, where the tests took place last year. The only other solid food taken was toast and sliced peaches at nine a.m.

To replace salt lost during perspiration, a harmless solution of water with a pinch of salt was given during games to prevent heat exhaustion.

The liquid meal was composed of a commercial product called Sustagen, a "surgical" type meal given to patients who cannot retain solids. It was given at 10:30 a.m. before the game.

Dr. Kenneth D. Rose and George F. Sullivan of the University Health Service and Paul J. Schneider of the Department of Athletics report the study in the Journal of the American Medical Association, 178:130, 1961.

• Science News Letter, 80:272 October 21, 1961

E FIELDS

ASTRONOMY

Star Watchers Approach 2,000,000 Observations

➤ A BAND of sky watchers, many of them amateurs who observe stars with big and small telescopes, are celebrating the half century mark of their organization, the American Association of Variable Star Observers, which has made one of the most fruitful explorations of the heavens.

Nearly 2,000,000 observations have been made and reported in the past 50 years. The stars watched are those that vary in brightness in such a way that it is possible to tell much about their life, behavior and composition.

Many of the 250 active observers and 600 members gathered for a three-day meeting at the Harvard Observatory, Cambridge, Mass.

In the last few months 803 variable stars have been viewed methodically by members with the help of identification charts and listings of stars of known brightness with which the variables are compared. Some of the observers with larger telescopes can record stars as faint as 15th and even 16th magnitude. The unaided eye can see down to about sixth magnitude.

There are still hundreds of variable stars to be observed and Mrs. Margaret W. Mayall, director of AAVSO, is constantly adding to the list of observers.

Continued volunteer observations of more than 600 long period variables give spectroscopists and other professional astronomers essential information for their studies. In addition to visual observations, some members are beginning to make readings of the light of stars by photoelectric means.

Old and new exploding stars, called novae, are also observed, as are flare stars and eclipses of the moon.

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AERONAUTICS

Vice President "Flies" Supersonic Plane

➤ VICE PRESIDENT Lyndon Johnson crashed twice in attempting to land a supersonic aircraft at Ames' Research Center, Moffett Air Force Base, Calif. No damage resulted, however, either to the craft or to the Vice President, since the landings were simulated efforts in a research test facility aimed at designing landing gear for future supersonic craft.

On the third try, with expert guidance and instruction from a pilot from the Ames flight systems and simulation branch, the Vice President made a perfect landing, demonstrating a talent for flight guidance.

The Vice President, who heads the Space Council, and Chairman George P. Miller (D.-Calif.) of the House Science and Astronautics Committee were on a two-day tour of space research centers in the United States.

The Vice President saw for the first time the X-14 jet-propelled vertical air transport, demonstrating characteristics required for vehicles to land on the moon. He also saw a C130 cargo aircraft take off and land in 600 feet.

The Vice President was impressed with the practical potential of both crafts, which might be adapted to current aircraft, eliminating the necessity for long and expensive runways now demanded for safe landings and take-offs by jet aircraft. He expressed the view that money now being spent on expensive runways might be better used for further research in this area.

During the tour the Vice President received a "tektite" made at Ames in the arc-jet chamber, where research is being conducted on a heat shield to be used to protect space ships going to the moon. Natural tektites are pieces of glass found in various areas of the world that supposedly come from outer space.

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GENERAL SCIENCE

Research Advised for Utopian Community

➤ A SCIENTIFIC experimental community should be set up where various kinds of living conditions could be tried out experimentally and the people living there could tell what their needs are and what new measures they like or dislike. This scientific way of building a utopia was suggested in a lecture at the University of Maryland, College Park, Md., by Dr. B. F. Skinner, psychologist of Harvard University.

This plan for utopian research was first suggested by Dr. Skinner in a fictional work entitled "Walden Two" published first in 1948. In Walden Two a committee made a study, for example, of the best type of vessels for serving tea buffet style. They concluded, after experiments, that a tall glass vessel in a basket-like covering with a bale that could be carried like a bucket would keep the tea hot longer with less chance of spilling than with the conventional cup and saucer. Because it would hold two or three cups, return trips to the tea urn for replenishing were avoided.

Plates for the little cakes were made square with turned over lips for easy picking up and carrying.

Buildings in Walden Two were connected by roofed, enclosed corridors. Many alcoves along the corridors contained floral decorations, stages where brief entertainment was offered, or tables where tea was sipped at appropriate times.

Dr. Skinner is well known for his original psychological research. He developed a teaching machine to speed and facilitate learning. He also added to the learning theory by experiments with rats that he taught to play with marbles, and with pigeons who learned to play table tennis and pick out tunes on a small piano.

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MILITARY SCIENCE

Military Space, Atomic Research Stressed

➤ A VIGOROUS effort in atomic and space research for military purposes is needed for the defense of the free world, a former undersecretary of the U.S. Air Force said.

Trevor Gardner said the threat to world peace is great due to Soviet advances in large thermonuclear bomb development "resulting from the present test series" and in the current Soviet ICBM test program.

Mr. Gardner, present board chairman and president of Hycon Mfg. Co., Monrovia, Calif., spoke at the Air Force's 8th Symposium on Science and Engineering in San Francisco.

"We have delayed the development of our military space program long enough." He blamed national emphasis on space for peace for the lag in the space program. The "decision makers have assigned a secondary role to the development of military space systems. This philosophical limitation should be removed," he said. He urged coordinated planning with the U.S. Department of Defense and the National Aeronautics and Space Administration to "assure maximum militarily useful results will be achieved."

The present booster lag that keeps the United States from the large efforts in space could be removed if a crash program in the military were initiated, he declared. The debate over solid versus liquid fuel boosters is shortsighted, he said.

"Both technologies should be developed. The $90,000,000 now allotted for solid-fuel rocket research is not adequate," he said. He urged more funding for such research as well as for nuclear rocket engine research. Mr. Gardner predicted that if enough emphasis were given to nuclear engine research, this would ultimately push us far ahead in space.

• Science News Letter, 80:273 October 21, 1961

TECHNOLOGY

New Computing Center To Be World's Largest

➤ GROUND WAS BROKEN in Cambridge, Mass., for a building to house the world's largest and most powerful commercial electronic computing center.

It will be the first building erected in Technology Square, an area adjoining the Massachusetts Institute of Technology, which the Institute is developing jointly with commercial concerns. It will house an array of computing machinery costing $15,700,000 that is scheduled to be in full-scale operation by January, 1963.

This will include a STRETCH computer that can multiply a 14-digit number by itself in 2.7 millionths of a second and work on as many as nine different programs simultaneously. The computer will select those problems having the greatest priority and schedule its own work load.

This and other computers will be operated by C-E-I-R, Inc., a data processing firm with headquarters in Washington, D. C.

• Science News Letter, 80:273 October 21, 1961

OCEANOGRAPHY

Exploring the Indian Ocean

A spirit of international scientific cooperation is present as scientists from more than 20 countries prepare for an assault on the Indian Ocean, Vincent Marteka reports.

➤ THE RUSH for exploring the Indian Ocean is on.

With aims as high but scope not as large as the International Geophysical Year (IGY), scientists from more than 20 countries are now banding together to explore the Indian Ocean. The survey is expected to extend man's knowledge of one of the earth's last unexplored areas and to possibly discover new sources of food for the hungry population living in its bordering countries.

Very little is known about the Indian Ocean, which covers 28,000,000 square miles or 14% of the earth's surface.

If all its waters were drained, huge uncharted areas of the exposed bottom would stretch as far as the eye could see. Only general features obtained from the few soundings of earlier surveys would be known. These would include deep trenches, high "mountains" and a prominent ridge cutting the ocean bottom in half.

The ocean water is reportedly highly fertile with sea food, yet the ocean is surrounded by many underdeveloped and underfed nations holding more than a quarter of the world's population.

The need for a systematic study was evident, and in 1958 a world-wide scientific body, the International Council of Scientific Unions, decided to plan an International Indian Ocean Expedition. True to the spirit of international cooperation, the expedition would be supervised by the Union's Special Committee on Oceanic Research and sponsored by the United Nations' Educational, Scientific, and Cultural Organization (UNESCO).

More than 20 countries and as many as 40 ships are scheduled to comb the Indian Ocean, plumbing its depths, tracing its circulation and sampling its sea life. Scientists from countries without oceanographic ships, especially those bordering the Indian Ocean, will work on vessels of such leading maritime countries as the United States, Russia and Japan.

Peak activity will be next year and 1963, with expeditions continuing through 1964.

Already scientists are preparing their "hardware" and ironing out final problems before next year's big push. An international meteorological center for collecting expedition weather data has just been set up in Bombay, India. A biological center is planned for Cochin, a small coastal town at the southern tip of India.

The ships' courses form a spidery network across the huge ocean. Oceanographic ships will sail out of ports in Australia, Africa, India and the East Indies. Some will make a wide circle touching all the bordering continents. Others will make a box-like network by cruising along latitude and longitudinal lines.

The ships will log more than 188,000 miles, or about eight trips around the world.

The systematic survey, the first of its kind on the high seas, encompasses the ocean's waters, its sea life, the ocean bottom and the air above it. All these seemingly unrelated elements are in reality strongly dependent upon each other.

For example, meteorologists will send aloft balloons carrying sensitive instruments to measure the monsoon winds that sweep back and forth across the ocean. Oceanographers will trace by carbon-14 measurements the ocean currents strongly influenced in a largely unknown way by these same winds.

Biologists with gaping nets will sample the sea life attracted to the agitated food-carrying currents, and other scientists will study the ocean bottom where many of the currents originated.

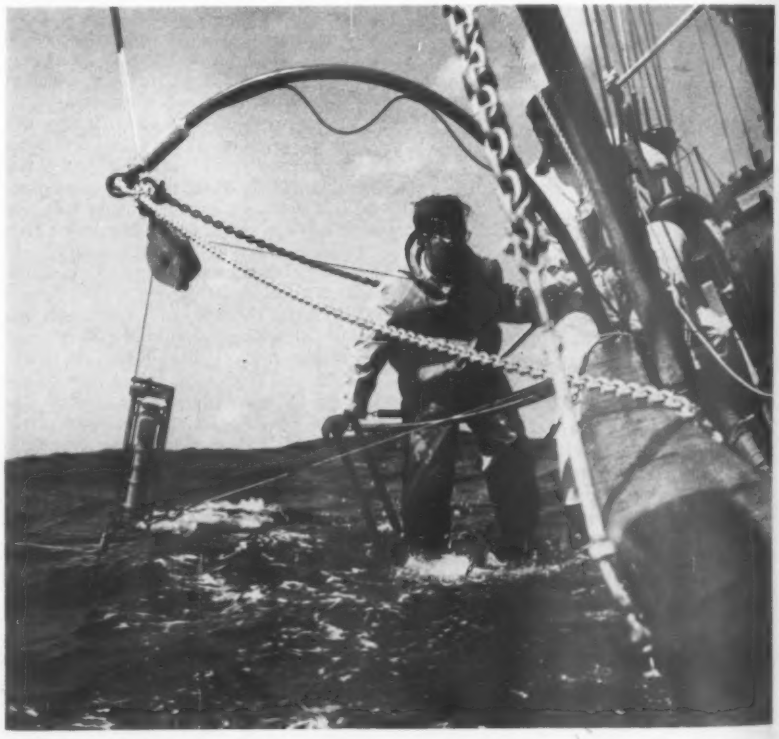
The apparent productivity of the ocean was startlingly illustrated a few years ago when a Russian ship reportedly saw millions of tons of dead fish floating in an area larger than the State of Missouri. The cause of the fish kill is still unknown, but the possible food source suggested is impressive.

The United States is expected to play a large role in the expedition, supplying about 10 ships and spending about $150,000,000 for the program. An especially-equipped biological ship filled with U. S. and foreign scientists will make a systematic survey of life in the ocean, while ships from key U. S. oceanographic institutions are scheduled to study the ocean bottom and the changing circulation.

The unique biological ship will try exploratory fishing in selected regions and concentrate on waters where intense upwelling brings up nutrients for fish from the bottom.

In a series of cruises, scientists of Scripps Institution of Oceanography, Lamont Geological Observatory and the Woods Hole Oceanographic Institution will study deep trenches near Africa, basins and ridges between India and Australia, and the mid-Indian Ocean ridge, a source of frequent earthquakes.

Woods Hole ships are expected to concentrate in the Arabian Sea area, and



OCEAN SAMPLING—United States scientist lowers Nansen "bottle" into choppy ocean to sample deep-sea temperature and salinity. Thousands of these samplings will be taken in the Indian Ocean starting next year.

Scripps scientists will also study the equatorial circulation influenced by the changing monsoon conditions.

The seasonal changes in sea level in the Arabian Sea and Bay of Bengal will be simultaneously monitored by 28 tide stations.

The Nimbus weather satellite, which will be orbiting over the ocean during the expedition, will photograph cloud cover and cyclone development. Below, an unmanned weather buoy will be silently collecting weather data.

The benefits reaped from the expedition will both add to the fund of scientific knowledge and also have a direct bearing on the people bordering the ocean. In many of these countries people are suffering from malnutrition caused by protein deficiencies and aggravated by an expanding population.

These countries will be able to expand their fisheries if new fishing areas are discovered.

Better understanding of the ocean's "heat engine" that drives the circulation of air above the surface may lead to better long-range forecasting of the monsoons. One step was taken in the right direction when the United States decided to give the expedition's weather buoy to the Indian Government after the expedition is over.

The weather buoy will act as a sentinel for storm development over the ocean.

And finally the scientists of the bordering countries will receive unparalleled training in the oceanographic sciences by working side by side with the world's top oceanographers during the expedition. The Asian and African scientists will go on the cruises performing various oceanographic tasks.

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GENERAL SCIENCE

News From Science Clubs

▶ HIGHLIGHTS from a few of the reports recently received by Science Clubs of America from its affiliated clubs:

THE PACELLI "Science for Peace" Club at Regina Coeli High School, Chiengmai, Thailand, has filled 16 showcases with its butterfly collection. Thailand has a great variety of butterflies and moths. The club has sent 60 specimens of one of the largest and most beautiful, the Atlas Atticus, to schools in Austria, France and America.

THE F.V.L. Science Club of Fox Valley Lutheran High School, Appleton, Wis., reports in its publication, "Distillations," that club-sponsored projects have included an annual science fair, a school museum, a Science Talent Search and guidance program, a science reference library, a science teachers' workshop, and the installation of an eight-inch reflector telescope at the school's Fuhrmann-Elias observatory. Fox Valley Lutheran was one of eight high schools in the nation to receive a National Science Foundation grant for a research project.

THE JUNIOR ASTRONOMY CLUB, headquartered at New York University and comprised principally of junior high schoolers, publishes a paper for the Northeast Region of the Astronomical League. The club has participated in programs involving the International Geophysical Year, Operation Moonwatch, the American Association of Variable Star Observers and the American Meteor Society.

THE SCIENTISTS of Tomorrow at George Peabody College, Nashville, Tenn., is an interschool club made up of members from Nashville's 15 high schools. Students from one or more of the schools present programs at the club's monthly meetings.

THE HOUSTON County High School Science Club at Erin, Tenn., is taking part in the community Civil Defense program.

THE PETIMUS Club at Central High School, Detroit, Mich., just organized this year, conducts scientific demonstrations and meets with other clubs.

IN ITS PUBLICATION, the Experimenter, the Onaway, Mich., High School Science Club urges its members "to take all the mathematics and science possible," and recommends special programs to encourage scientific interests among sixth, seventh and eighth graders.

NEW CO-PROJECTS that clubs, classes and groups can undertake in cooperation with leading scientific organizations are outlined in the new 1961-62 Sponsor Handbook Supplement, now being mailed to club sponsors. Clubs not yet affiliated can do so, at no cost, simply by writing to Science Clubs of America, 1719 N Street, N.W., Washington 6, D.C.

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GENERAL SCIENCE

Survival Food Samples Available in New Kit

▶ SAMPLES of foods that might be useful in the event of a nuclear attack or other national disasters are spotlighted in a new, low-priced science kit now available.

The Survival Food unit of THINGS of science, just issued by SCIENCE SERVICE, is particularly timely because of widespread renewed interest in civil defense and emergency planning.

Included in the kit are three unusual foods—a multi-purpose food made from soybeans, a survival ration cracker and bulgur wheat. A vitamin C tablet as a food supplement and an iodine tablet to purify water complete the set.

Directions for performing 18 educational experiments, including testing and preparation of the food samples, are enclosed.

The kit (No. 250) can be ordered from THINGS of science, SCIENCE SERVICE, 1719 N Street, N.W., Washington 6, D. C. The price is 75 cents each, or three units for $2.00. Membership in THINGS of science brings 12 different units, one each month, for only $5.00.

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AERONAUTICS AND ASTRONAUTICS: An American Chronology of Science and Technology in the Exploration of Space, 1915-1960—Eugene M. Emme, foreword by Hugh L. Dryden—*NASA (GPO)*, 240 p., $1.75 Historical outline, followed by chronicles of satellites and space probes, world airplane records, balloon flights and awards.

AIR POLLUTION—K. Barker and others—*Columbia Univ. Press*, 442 p., illus., $10. Historical review and technical papers reflecting current world trends in air pollution research. Monograph published on behalf of WHO for the benefit of public health officials.

ALL ABOUT THE SYMPHONY ORCHESTRA AND WHAT IT PLAYS—Dorothy Berliner Commins, foreword by Thomas Scherman—*Random House*, 137 p., illus. by Warren Chappell, photographs, $1.95. For the young who are interested in music.

ANYONE CAN LIVE OFF THE LAND—James Ralph Johnson—*Longmans*, 121 p., illus. by Edward Shenton, $2.95. A practical book about survival in the wilderness.

ATTACK ON STARVATION—Norman W. Desrosier—*Avi Pub. Co.*, 312 p., illus., $6.75. Food expert discusses diets, food resources, food storage and distribution, world food consumption patterns, technological breakthroughs and agricultural practices.

BESTIAIRE D'AMOUR—Jean Rostand, transl. from French by Cornelia Schaeffer—*Doubleday*, 128 p., illus. by Pierre-Yves Tremois, $5.95. The eminent biologist's view of sex and love in the animal kingdom, handsomely illustrated.

BIRD DOCTOR—Katherine Tottenham—*Nelson*, 162 p., photographs, $3. Describes personal experiences with taking care of various sick and injured birds.

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CURRENT PROBLEMS IN ELECTROBIOLOGY—Dominick P. Purpura, Ed.—*N.Y. Acad. of Sciences*, Annals, Vol. 94, Art. 2, 323 p., illus., paper, $3.50. Series of papers of a conference supported jointly with AAAS in December 1960.

EDUCATIONAL VALUES IN CLUB PROGRAMS—John A. Beaumont and George Sanders—*Off. of Educ. (GPO)*, 18 p., paper, 15¢. Basic principles to serve as guides in developing club activities.

ELECTRIC MACHINERY: The Dynamics and Statics of Electromechanical Energy Conversion—A. E. Fitzgerald and Charles Kingsley, Jr.—*McGraw*, 2nd ed.. 568 p., illus., $10.75. Reorganized text, gives emphasis to dynamic systems.

ELECTRONIC AMPLIFIER CIRCUITS: Theory and Design—Joseph Mayo Pettit and Malcolm Myers McWhorter—*McGraw*, 325 p., diagrams, $9.75. Text and reference for advanced students and electronics engineers.

EXPLORATIONS IN SCIENCE: A Book of Basic Experiments—Harry Milgrom—*Dutton*, 127 p., illus. by Anne Marie Jauss, $3. Clearly explained experiments using the simplest materials.

THE FOREST PEOPLE—Colin M. Turnbull—*Simon & Schuster*, 285 p., photographs, maps, $4.95. Anthropologist's narrative about customs and everyday life of the Pygmies in the Congo among whom he lived for three years.

FUNDAMENTALS OF ALGEBRA: TMI-Grolier Self-Tutoring Course—Frank C. Gentry and Charlotte Yesselman, Eds.—*Teaching Materials Corp.*, 246 p.. boxed., $10. Loose-leaf course (6th to 9th grade), programmed for self-instruction at student's own speed.

JUNIOR SCIENCE BOOK OF ELEPHANTS—William D. Sheldon—*Garrard Press*, 65 p., illus. by Mathew Kalmenoff, $2.25. Elementary reading level.

LOOK AT THE SKY!—Eric Sloane—*Duell*, 76 p., illus. by author, $3.95. Describes the eventful journey of a cold air mass and how it creates weather in the United States.

MAGNETIC TAPE INSTRUMENTATION—Gomer L. Davies—*McGraw*, 263 p., diagrams, $8.50. Guide to expert information on the techniques and equipment used for magnetic tape recording and reproduction of data, as distinguished from voice and music.

THE MAIN STREAM OF MATHEMATICS—Edna E. Kramer—*Fawcett*, 352 p., illus., paper. 75¢. Reprint of 1951 edition.

MENTAL AFTERCARE: Assignment for the Sixties—Emma Harrison—*Public Affairs Committee*, Pamphlet No. 318, 28 p., illus., paper, 25¢ direct to publisher, 22 E. 38th St., New York 16, N. Y. Explains program of guided rehabilitation for the mentally ill within the community.

MICROBIOLOGY IN YOUR FUTURE—*American Society for Microbiology*, 20 p., illus., paper, single copies free upon request direct to publisher, 19875 Mack Ave., Detroit 36, Mich. Discusses the scope, the various areas of specialization and employment outlook in microbiology.

MODERN MAGNETISM—L. F. Bates—*Cambridge*, 4th ed., 514 p., illus., paper, $2.95. Updated and revised by author, including much new work on ferromagnetic domains and magnetothermal phenomena.

MODERN SPACE SCIENCE—Frederick E. Trinklein and Charles M. Huffer—*Holt*, 550 p., illus., $6.75. Treats the discoveries and principles upon which the conquest of space is built at high school level, assuming only one year of algebra.

THE NEW BIOLOGY: First Semester Study Guide—Ray Koppelman—*Addison-Wesley*, 144 p., illus., paper, $2.50. Official guide for CBS-TV college of the air, emphasizing in outline those particulars necessary for an understanding of biology as a continuing study.

OUR EARTH: Geology and Geologists—Marian T. Place—*Putnam*, 191 p., illus. by R. Bartram, $2.95. Explains to boys and girls what geology is and tells about some of the field trips of great pioneering geologists.

PHYSICAL MECHANICS—Robert Bruce Lindsay—*Van Nostrand*, 3rd ed., 471 p., diagrams, $9.75. Intermediate course, stressing fundamental concepts and principles of mechanics and their use in all branches of physics.

PRINCIPLES OF LINEAR NETWORKS—Bernard Friedland, Omar Wing and Robert Ash—*McGraw*, 270 p., diagrams, $8.95. Textbook for undergraduate work in electronics.

PRINCIPLES OF ORGANIC CHEMISTRY: An Introductory Text in Organic Chemistry—James English, Jr. and Harold G. Cassidy—*McGraw*, 3rd ed., 515 p., $8.95. Full-year course stressing fundamental principles.

PSYCHOTHERAPY EAST AND WEST—Alan W. Watts—*Pantheon Bks.*, 204 p., $4.50. Critical history of psychiatric interest in Eastern thought with a comparison of major forms of psychotherapy and techniques of the Eastern disciplines.

RECENT PROGRESS IN HORMONE RESEARCH, Vol. XVII: The Proceedings of the Laurentian Hormone Conference—Gregory Pincus, Ed.—*Academic Press*, 600 p., illus., $14. Papers concerned with testis function, reproduction, aldosterone activity, neurohypophyseal physiology, and hormonal regulation of carbohydrate metabolism.

SCHOOL MATHEMATICS IN OEEC COUNTRIES: Summaries—*Organisation for European Economic Cooperation*, 116 p., paper, single copies free upon request direct from publisher, 1346 Conn. Ave., NW, Washington, D. C. Outline of existing programs of mathematics education in European countries, from Austria to Yugoslavia.

SYNTHESIS OF OPTIMUM CONTROL SYSTEMS—Sheldon S. L. Chang—*McGraw*, 381 p., diagrams, $11.75. Intended for graduate course in advanced design techniques for high performance systems.

• Science News Letter, 80:276 October 21, 1961

ISAAC ASIMOV reviews children's science books in **THE HORN BOOK MAGAZINE**, journal of the children's book world. 6 issues a year, $5.00

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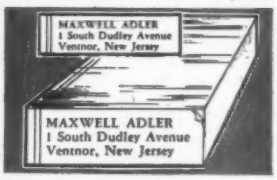

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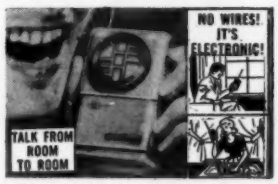

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SPACE-AGE PROTECTIVE FABRIC for personnel making and handling missile fuels is a fluorocarbon laminated material reportedly more resistant to chemicals than any other fabric yet evaluated. It is expected to be used in industrial protective equipment, including outerwear, especially where flash fires and exposure to extremely corrosive chemicals are hazards.

• Science News Letter, 80:278 October 21, 1961

CLIPPINGS CUTTER is a cutting device having a specially pointed high carbon blade that permits easy, non-destructive removal of clippings, even from the center of a magazine or newspaper page. The point is simply inserted into the page and the cutter pushed around the article. The compact clipper fits easily into pocket or purse.

• Science News Letter, 80:278 October 21, 1961

INSTANT INK CAPSULE provides a quick refill for a fountain pen. The one-inch-long capsule is inserted into the barrel of the fountain pen and dipped into water for about 30 seconds. The ink concentrate dissolved by the water flowing through it by capillary action fills the barrel with enough ink for 5,000 words.

• Science News Letter, 80:278 October 21, 1961

PLASTIC DISPENSER LID for canned syrups, juices and oils stops dripping down

the side of cans. Made of polyethylene and available in several sizes, the pouring lid, shown in the photograph, with spout is snapped on after the top of the can has been punctured or cut out. A cap covers the spout when not in use.

• Science News Letter, 80:278 October 21, 1961

TRIGGER GUARD that covers the trigger of a gun making it impossible to fire helps prevent shooting accidents. Made of black, high impact styrene resistant to hard blows or excess forcing, the shield is fitted with an interlocking screw-on key lock for additional safety.

• Science News Letter, 80:278 October 21, 1961

PLASTIC SHELF TRACKS have built-in support tabs that can be simply pushed in to adjust the height of shelves. The resilient tabs spring back after each adjustment. Made of strong and stiff acetal resin, the tracks are suitable for a wide variety of shelves.

• Science News Letter, 80:278 October 21, 1961

ELASTIC STOP NUT KIT, practical for machine and repair shops, contains a selected assortment of more than 250 plated, carbon steel self-locking elastic stop nuts in a variety of thread sizes. The nylon locking insert grips the bolt threads with a 360-degree perfect fit that will not loosen under the most severe vibration conditions.

• Science News Letter, 80:278 October 21, 1961

DROWSY DRIVER ALERT to force sleepy drivers to attention is wired into the electrical system of the car. Three alerting signals of increasing intensity which follow in sequence are produced by the unit: a flashing light, blowing of the horn, and severe jolting of the car, ending with automatic shut-off of the ignition. The driver can stop the cycle at any point by pressing the horn.

• Science News Letter, 80:278 October 21, 1961

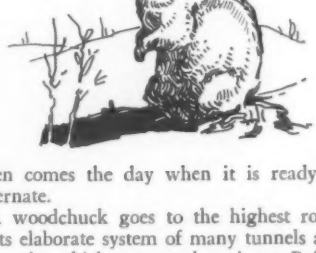
Nature Ramblings

➤ NOW THE FLAT-HEADED woodchuck is no longer active. In fact ever since the middle of September the woodchuck has been disappearing from its range, and settling down for the winter in a state of suspended animation known as hibernation.

The first woodchucks to go to sleep for the winter are those in the north. They frequent a range from northeastern Quebec to Nova Scotia across the continent to southwestern Yukon. The period of hibernation for these animals may be as long as six months. The farther south a woodchuck is, the later hibernation starts and the shorter it is.

All summer long any woodchuck eats as much as it possibly can. This gorging is to put on layers of fat to sustain life during its long winter sleep. Just before going underground for the last time of the year, a 'chuck stops all eating. There is an interval of several days, marked by apparent irritation, when the animal eats nothing.

Woodchuck



Then comes the day when it is ready to hibernate.

A woodchuck goes to the highest room in its elaborate system of many tunnels and rooms in which to pass the winter. Before it settles down permanently, the animal scrapes some dirt from the floor. It uses this to plug the entrance to the room.

The woodchuck is now ready to hibernate. At first the sleep is light. But in time it becomes a sleep akin to death.

• Science News Letter, 80:278 October 21, 1961

Do You Know?

Cows in Hawaii yield nearly ten times more milk than those in Pakistan.

Eleven transuranium *elements*, those that are heavier than uranium in the periodic table, have been discovered since 1940.

Enrollments in elementary and secondary schools rose 44.5% in the past decade and the number of classroom teachers rose 42%.

Of the *chemical products* on the market today, 85% were unheard of ten years ago.

Most naturally-occurring *diamonds* are single crystals.

Nematodes, the most numerous animal on the earth, have been thawed from the antarctic ice after years or centuries in the extreme cold, have been found in desert sands, at the bottom of deep lakes and universally in the soil.

• Science News Letter, 80:278 October 21, 1961

INVENTION

Patents of the Week

➤ A CONVERTIBLE stadium with a playing field that changes shape for different sports, and a convertible auditorium that can be quickly turned into two separate auditoriums, have been patented.

John W. Waterbury of Irvington, N.Y., was awarded patent No. 3,002,234 for the stadium, which features a movable seating section with the outer edge supported by wheels that can be rolled along a circular track. Shifting this section back and forth makes the playing field either rectangular, for such sports as football, soccer and lacrosse, or pie-shaped, for baseball.

Rights were assigned to Praeger-Kavanagh-Waterbury, New York City.

The auditorium concept won patent No. 3,002,233 for Gyo Obata, Webster Groves, Mo., with rights assigned to Hellmuth, Obata & Kassabaum, Inc., St. Louis.

The hexagonal (six-sided) structure is divided in the center by two triangular platform areas, suitable for stages or pulpits. A movable wall, raised hydraulically from a well in the floor, "splits" the building into a pair of five-sided assembly halls, leaving one platform and one seating area in each of the two subchambers.

One of the subchambers would have seats that could be turned to face the other platform area when the full-sized auditorium has a large audience.

Patent No. 3,002,838 went to Patrick L. Hughes, Lakeland, Fla., and Jonathan B. McKay, Bascom, Ohio, for a process to produce high-protein stock feed from low-grade citrus fruit, including its seeds and peelings. Rights were assigned to Gavin D. McKay, De Kalb, Ga.

The pulp and the liquid are separated, and the liquid portion is fermented and evaporated to produce an enriched molasses. The shredded pulp and the molasses are then mixed and dried to form the feed, which can be treated with ultraviolet rays to add ergosterol, a nutritious vitamin. Propagation of yeast during the fermentation process makes the ultraviolet treatment possible, the inventors claim.

Automation comes to the hen house in an invention that won patent No. 3,002,494 for Loren C. Murray of rural Elkhart, Ind. Eggs laid by hens in a row of cages fall from a sloping floor onto a conveyor belt that takes them to a curved chute, where they roll slowly down to another belt that takes them to a common gathering point.

Inventor Alfred T. Dube of rural Waterbury, Conn., was awarded patent No. 3,002,484 for a boat he calls "practically impossible to capsize" and sink-proof even if it should capsize.

A long pontoon is linked to each side of a small or medium-sized boat. In addition to providing smoothness, stability and additional safety in rough water, the pontoons also serve as an auxiliary power source. Each pontoon contains a hydraulic motor operating a propeller. The pontoon motors will power the boat if the main motor fails.

An explosion-proof plug for containers holding highly volatile liquids was given patent No. 3,002,648, awarded to Glenn T. Rieke of Rieke Metal Products Corporation, Auburn, Ind.

The plug's valve structure is designed to relieve internal pressure within the container under abnormal temperatures, preventing it from reaching an explosive level. A compressed spring holds the valve in a closed position against a predetermined maximum pressure.

A shoe-scraping bar with brushes mounted on each side permits cleaning muddy shoes prior to entering the house, without having to stand on one leg, stoop, or perform other gymnastic feats, according to inventor Paul G. Mathes, Quincy, Ill. He received patent No. 3,002,211 and assigned rights to Trio Manufacturing Co., Griggsville, Ill.

Squares of ground meat are shaped into spherical meat balls in a hand-cranked device for which George A. Rikhoff of rural Pueblo, Colo., was awarded patent No. 3,002,220.

A toy rocket ship invented by Allen G. Roth, Indianapolis, Ind., is big enough to hold two small passengers. The fiberboard craft gives the feel of space travel by picture displays that show the world as it would appear during take-off, then from the stratosphere and from outer space. Rights to patent No. 3,002,752 were assigned to Lester Matheson, Indianapolis.

• Science News Letter, 80:279 October 21, 1961

ROENTGENOLOGY

Cooling Skin Reduces Radiation Damage

➤ BY COOLING the areas of skin through which radiation passes, skin damage from X-rays and other radiation used in the treatment of cervical cancer can be materially reduced, Drs. Edwin J. Liebner, Walter S. Moos, Martin Hochhauser and Roger A. Harvey, University of Illinois in Chicago, told the American Roentgen Ray Society in Miami, Fla. Cool water is circulated over the skin reducing its temperature during the few minutes of radiation treatment.

• Science News Letter, 80:279 October 21, 1961

Questions

PUBLIC HEALTH—What six diseases have decreased in Latin America? p. 269.

SPACE—By what method can life on Mars be detected? p. 267.

Photographs: Cover, Stanford University; p. 267, General Electric Company; p. 268, Ling-Temco-Vought, Inc.; p. 269, Battelle Memorial Institute; p. 271, Burroughs Corporation; p. 274, Woodshole Oceanographic Institute; p. 278, Siax Industries, Inc.

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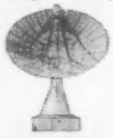
Why do we make this generous offer? Simply to introduce you to an exciting new way to understand and enjoy the scientific marvels all around us.

YOU ARE THERE... inside the Mercury Capsule, atop the Redstone Rocket. You check your instruments. *All O.K.* You hear the countdown: *"Five... four... three... two... one... LIFT OFF!"*

As the Redstone zooms up, "G" forces press against your body. You flash reports back to earth. "Pressure and oxygen A.O.K."..."Capsule separating from booster."... "Switching to manual controls."..."Periscope out. Beautiful sight!"... "Retro-rockets fired."... "Approaching re-entry."... "ALL CLEAR, have helicopters stand by!"



Giant tracking antennae follow you through space!

Thanks to the exciting new *Science Program*, YOU share these thrilling adventures of America's ASTRONAUTS.

For only 10¢ you get the fascinating "Man in Space" sample Activity Kit – and, as a special introductory gift, you ALSO receive a Revell scale model of the Mercury Capsule and Redstone Rocket, with accessories. You learn about the problems facing America's spacemen. IT'S ALMOST LIKE BEING AN ASTRONAUT YOURSELF!

Enjoy Monthly Adventures

Each month this new program will take you on a "guided tour" of a different field of science. One month a chemist will show you metal that burns and gas that pours. A biologist will let you look through his microscope. On other adventures your guides will be radio engineers... medical researchers... nuclear physicists.

Each month you receive sheets of full-color photographs – also an illustrated album, crammed with information, with spaces for mounting the pictures. In addition, there will be many interesting things to do.

What It Will Mean to Your Family

Think what these adventures will mean to your family – especially children! It will stimulate interest in science projects. It will help prepare them for life in the space age – may even lead to a scientific career.

MAIL COUPON with only 10¢ for the Introductory Package *(including sample Activity Kit and, as your special introductory gift, the complete space capsule model)*. With it we will also send the current Activity Kit for which you will be billed only $1, plus shipping. No further obligation. If you do not wish to continue, simply write us within 10 days. Otherwise, you pay only $1 (plus shipping) for each month's adventure. You may cancel at any time. Send the coupon right now, with only 10¢, to: *SCIENCE PROGRAM*, Dept. 1-NR-O; Garden City, New York.

COUPON BRINGS YOU ALL THIS

For Only 10¢ with a Trial Membership in the SCIENCE PROGRAM.

1. *Special Introductory Gift:* AUTHENTIC MERCURY SPACE CAPSULE model (that really opens to show removable Astronaut) and famous REDSTONE ROCKET BOOSTER with accessories. (See above.) *31 PIECES!*

...and your Sample Activity Kit...

2. Beautiful full-color prints of wonders of "MAN IN SPACE" – research, rockets, tracking equipment, radiation, etc.
3. 8,000-word, illustrated album – crammed with facts on "MAN IN SPACE," with spaces in which to mount the color prints.
4. Huge Wall Chart with gummed, full-color snap-outs of manned Space Capsules, to be mounted on the chart.
5. Monthly Science Bulletin keeps you abreast of latest developments.

...and, as an EXTRA...

6. A handsome pull-drawer library case large enough to hold a number of albums.

SEND COUPON TODAY

SCIENCE PROGRAM, Dept. 1-NR-O, Garden City, N.Y.

I enclose 10¢ to help cover shipping. Please rush me my Introductory Package described above. Also enroll me as a member of the Science Program and send the current Activity Kit with a bill for only $1 plus shipping.

After examining this package, I may cancel membership simply by writing you within 10 days. In this case I may return everything and owe nothing. As a member I will receive a new Activity Kit every month for only $1 each plus shipping. I do not have to take any minimum number of future Kits, and may resign any time I wish.

Name.....
(PLEASE PRINT PLAINLY)

Address.....

City.....Zone....State.....

Offer good in U.S.A. only 22-SC21